



## A prosperous future requires pre-emptive planning

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population trends, and future expansion is needed. Ensuring that infrastructure is designed with flexibility for future modifications will help accommodate evolving needs.

### ECONOMIC GROWTH THROUGH TOURISM AND INDUSTRY

Tourism can be a major economic driver in a stable society with enforced law and order. Bangladesh has rich archaeological sites that still remain inaccessible. Proper conservation and promotion can attract international tourists, creating demand for hotels, transport, and services, fuelling economic growth. Investments in tourism infrastructure can generate significant revenue and create employment opportunities in related sectors.

### SUSTAINABLE CONSTRUCTION AND MATERIALS

Bangladesh has limited stone resources. Historical structures used bricks, while modern projects rely on expensive imported stone. Efficient use of local materials is essential for cost-effective construction. Many sites, such as the Shat Gombuj Mosque and Mahasthangarh, have survived for centuries due to superior construction techniques of that time. However, more recent construction often sacrifices quality for speed, leading to shorter lifespans. Research into historical methods can improve durability and sustainability through relearning, ensuring that new structures maintain long-term resilience. Prioritising sustainable use of locally available materials can reduce reliance on imports and lower construction expenses.

At this stage of development, reducing reliance on bricks is critical. Brick production damages agricultural land and harms the environment. Alternative materials like compressed earth blocks and lime-pozzolan-concrete should be explored. Historically, lime concrete was widely used before cement became dominant, offering a more environmentally friendly alternative to current methods.

Until the Jamuna Bridge project, Bangladesh had only two cement factories. Now, cement and brick aggregate use has surged, though brick aggregate concrete is proven to be less resilient in disasters. The Rana Plaza collapse highlighted its

risks. Reducing brick usage in high-rises is necessary to enhance structural safety and longevity.

Heavy brick walls increase structural costs and earthquake loads. Dry partition walls and lighter materials should be considered. Internationally, wood is a common alternative. Importing wood from reforested regions could be a sustainable option. Encouraging innovative construction techniques that use sustainable materials can also promote environmental conservation.

will support Bangladesh's long-term development. By leveraging historical knowledge and implementing sustainable strategies, the country can balance economic growth with environmental conservation and infrastructure resilience.

### INNOVATION AND SKILLED WORKFORCE DEVELOPMENT

One modern technology gaining traction, with roots in earlier practices, is Cross Laminated Timber (CLT). CLT is a type of processed wood suitable for construction. Processed wood offers several advantages:

possibilities, unlike bricks. While bricks have potential for use as supplementary cementing material, further research is needed. This would allow us to use cement and steel more judiciously. Cement is a technology, and using it efficiently and reducing its use contributes to green engineering. Steel can also be used in green engineering. This approach could reduce concrete usage, with wood taking its place. These opportunities are within our reach. We would, of course, not cut down our forests; we would import wood, taking advantage of international trade opportunities. This approach ensures environmental sustainability.

Next, we need to focus on rapid construction techniques. This requires a skilled and properly enforced labour force. With a suitable industrial and institutional framework, we can address inequalities in the sector. This means formalising the entire construction sector. Expensive constructions, in terms of lifecycle cost, are a major problem. For example, if a structure built with five units of money lasts for five years, while one built with 10 units lasts for 20 years, the cheaper option is ultimately more expensive. However, we often lack this long-term perspective. We might not be able to afford the initial cost of the 10-unit construction and opt for the five-unit one, leading to increased lifecycle costs. This is particularly evident with concrete.

Research has revealed instances of extremely low-strength concrete being used on construction sites. Even when trying to replicate this in a lab with suboptimal methods, it was difficult to achieve such low strengths. This points to non-engineered construction, where anything can happen, and minimum standards remain severely unsatisfied. Substandard materials in non-engineered construction can lead to unexpected failures. For example, concrete mixing water should be potable, though not necessarily distilled. While pond water, though non-potable, might contain fines that create a large surface area for cement bonding, insufficient cement can result in very low-strength concrete. This type of construction creates significant problems.

Formal construction, using prefabrication, can help ensure minimum quality standards.

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Scientific research on historical construction techniques is necessary to rediscover durable and sustainable practices. Many ancient structures in Bangladesh have stood for centuries due to superior materials and craftsmanship. Integrating traditional methods with modern engineering can enhance construction quality while preserving historical integrity.

A holistic approach to land acquisition, transport planning, and material use

**Efficient use of local materials is essential for cost-effective construction.**

PHOTO: STAR

it is lighter, and its carbon footprint is very low. Furthermore, it is 100 percent recyclable. Wooden walls provide excellent soundproofing, and international fire resistance codes exist for them. If designed correctly, CLT can achieve high fire resistance ratings. Another advantage is that future building modifications can incorporate the existing wood, adding thickness or repurposing it for other uses, such as furniture or paper. Wood offers hundreds of uses and recycling

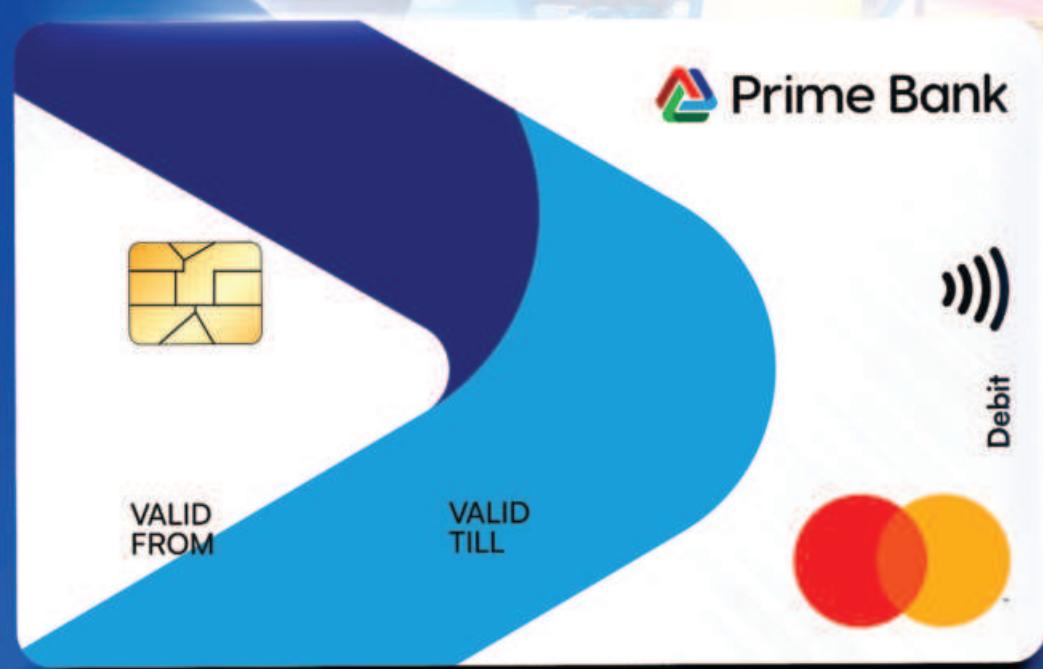


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